VALEYEV, A.M.; GOLEV, Yu.D.; GOLEVA, Z.N.; GOLOVKO, R.Ye.; ZAV'YALOVA, B.A.; ZARETSKIY, B.A.; ZVEREV, Ye.A.; LIPINSKIY, F.A.; MANGUSHEV, I.Kh.; MEYZLER, M.Kh.; MUTOVKIN, V.A.; RUDAKOV, Ya.D.; RUKOYANOV, B.P.; KHASANOV, G.M.; ESTRIN, Z.I.; ZUDIN, B.A., red.; BORUNOV, N.I., tekhn. red.

[Adjustment and operation of equipment in the Novo-Ufimskii Heat and Electric Power Plant] Naladka i ekspluatatsiia oborudovaniia na Novo-Ufimskoi TETs. Moskva, Gos. energ. izd-vo, 1961. 175 p. (MIRA 14:9)
(Bashkiria—Electric power plants)
(Bashkiria—Heating from central stations)

VALEYEV, A.M., inzh.

Some features of a long-distance power distribution protection system using a Bresler relay. Elek. sta. 33 no.7:88-89 Jl '62. (MIRA 15:8)

(Electric power distribution--Equipment and supplies)

VALEYEV, A.M., inzh.

Electrical equipment maintenance and servicing intervals and labor productivity. Elek. sta. 35 no. 4:66-67 Ap '64. (MIRA 17:7)

VALEYEV, A.M., inzh.

Automatic voltage control on d.c. busbars. Elek. sta. 35 no.10:84-86 O'64. (MIRA 17:12)

VALEYEV, A.S.

Determining the optical constants of thin low-capture films.
Opt. i spektr. 15 no.4:500-511 O '63. (MIRA 16:11)

ACCESSION NR: AP4042985 S/0051/64/017/001/0093/0101

AUTHOR: Valeyev, A. S.

TITLE: Effect of weak absorption in layers on the position and magnitude of the extremum of transmission and reflection of a multilayer coating

SOURCE: Optika i spektroskopiya, v. 17, no. 1, 1964, 93-101

TOPIC TAGS: optical absorption, light filter, coated optics, dielectric coating, light reflection, optical transmission

ABSTRACT: The analysis was undertaken to explain the discrepancy between the theoretical transmission of commonly used multilayer dielectric optical coatings and the experimental results. Formulas are derived to take into account the net effect of true absorption and of scattering by inhomogeneities and defects in the layers, and to determine the positions of maximum and minimum transmission and

Card 1/2

ACCESSION NR: AP4042985

absorption of the coatings. Calculations are presented for some concrete types of multilayer coatings and interference filters, but it is emphasized that the optical properties of such coatings are not governed by the absorption alone, and that the effect of variations in the layer thickness and of optical inhomogeneities must also be evaluated. "In conclusion, I thank P. G. Kard for valuable remarks." Orig. art. has: 22 formulas and 2 tables.

ASSOCIATION: None

SUBMITTED: 18Jul63 ENCL: 00

SUB CODE: OP NR REF SOV: 004 OTHER: 000

Card 2/2

ACCESSION NR: AP4042986 S/0051/64/017/001/0102/0112

AUTHORS: Yafayeva, V. B.; Valeyev, A. S.

TITLE: Interference optical band filters

SOURCE: Optika i spektroskopiya, v. 17, no. 1, 1964, 102-112

TOPIC TAGS: light interference, light filter, band spectrum, dielectric coating, optical transmission

ABSTRACT: The use of multilayered dielectric coatings for the construction of optical filters that transmit a limited band of the spectrum is considered. The analysis is limited to narrow-band filters made up of alternating quarter-wave layers with large and small refractive indices, respectively. General equations are derived for the transmission coefficient and bandwidth of such a filter by a method which can be generalized to include coatings made up of layers of more than two substances. Results of electronic-computer

Card 1/2

ACCESSION NR: AP4042986

calculations based on this method are presented for several concrete filters and are shown to be in good agreement with the experimental results. Orig. art. has: 7 figures, 5 formulas, and two tables.

ASSOCIATION: None

SUBMITTED: 31Aug63 ENCL: 00

SUB CODE: OP NR REF SOV: 003 OTHER: 005

Card 2/2

L 64467-65 EWT(1)/T IJP(c)
ACCESSION NR: AP5012621 UR/0051/65/018/005/0889/0891
535.321 + 535.341.001.1

AUTHOR: Valeyev, A. S.

TITLE: On a technique for the determination of the optical constants of thin weakly absorbing layers

SOURCE: Optika i spektroskopiya, v. 18, no. 5, 1965, 889-891

TOPIC TAGS: light absorption, optic constant, optic measurement, light filter, refractive index

ABSTRACT: The method previously published by the author (Opt. i spektr. v. 15, 500, 1963) is supplemented by an investigation of the possibility of using a weakly absorbing substrate, of the accuracy of the method, and of the means by which optical constants can be determined from single extremal points. The transmission coefficient of a film deposited on a weakly absorbing substrate is calculated and the conditions under which the [illegible] of the substrate can be neglected are determined [illegible]

Card 1/2

L 64467-65

ACCESSION NR: AP5012621

shows that the systematic error is the larger, the less the refractive index of the film differs from the refractive index of the substrate and from unity. A procedure is shown for calculating the optical constants in the case when it is impossible to derive minimum and maximum curves for the layer, such as happens when it is necessary to determine the optical constants of a layer with an optical thickness on the order of $\lambda/4$ -- $\lambda/2$, when the transmission curve has only one minimum or maximum in the spectral region of interest. This is done by depositing two layers under identical conditions on two equal substrates, one of thickness $\lambda/4$ and the other [illegible] $\lambda/2$. The modification that this necessitates in the formulas [illegible] earlier reference is described. Orig. art. has: 15 formulas and 1 figure.

ASSOCIATION: None

SUBMITTED: 13Apr64 ENCL: 00 SUB CODE: OP

NR REF SOV: 001 OTHER: 000

Card 2/2

L 44444-66 EWT(l)/EWT(m)/EWP(i)/T/EWP(t)/EWP(b)/EED(b)-3 IJP(c) JD

ACCESSION NR: AP5017901 UR/0051/65/019/001/0121/0127

535.321 + 535.341-15

46
B

AUTHORS: Valeyev, A. S.; Gisin, M. A.

TITLE: Optical properties of thermally deposited antimony trisulfide and tellurium layers in the infrared spectral region

SOURCE: Optika i spektroskopiya, v. 19, no. 1, 1965, 121-127

TOPIC TAGS: antimony compound, tellurium, IR spectrum, optic property

ABSTRACT: Although the substances in question are widely used as high-refractive-index layers for infrared applications, their optical constants have not been adequately investigated in the past. The present paper presents the results of the determination of the refractive index and the absorption coefficient in the region where these layers have maximum transparency and in the adjoining regions, namely 1 -- 23 μ for antimony-trisulfide and 2 -- 15 μ for tellurium layers. The procedure used to determine the optical constants is described elsewhere (Opt. i spektr. v. 15, 500, 1963) and is based on

Card 1/4

L 4444-66
ACCESSION NR: AP5017901

determining the refractive index and the absorption coefficient from the measured maximum and minimum values of the transmission coefficient of the layer by successive approximations. The main results are shown in Figs. 1 and 2 of the Enclosure. The large scatter in the experimental point attributed to inhomogeneities in the structure of the layer which gives rise to a great variety in the properties of the layers of different thicknesses and of different internal structure. Tests of the effect of heat treatment in air and in vacuum have shown that heat treatment produces noticeable changes in the optical constants of the tellurium layers. This is interpreted from the point of view of the response of the inhomogeneities, which consist of amorphous and crystalline sections, to the different heat treatment conditions. Orig. art. has: 4 figures, 1 formula, and 3 tables.

ASSOCIATION: None

SUBMITTED: 08May64 ENCL: 02 SUB CODE: OP

NR REF SOV: 005 OTHER: 006

Card 2/4

L 4444-66
ACCESSION NR: AP5017901

ENCLOSURE: 01

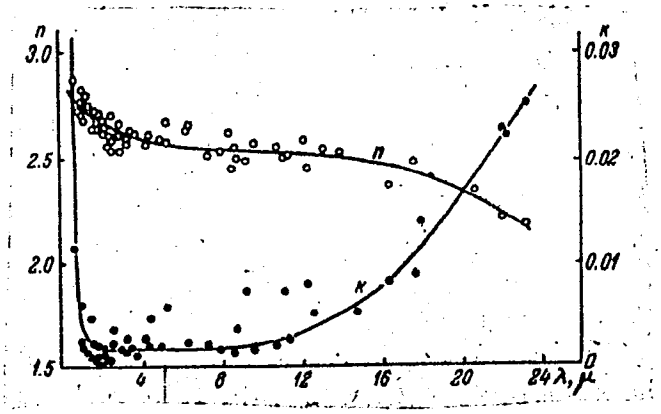


Fig. 1. Optical constants of antimony trisulfide layers

Card 3/4

L 44444-66
ACCESSION NR: AP5017901 ENCLOSURE: 02

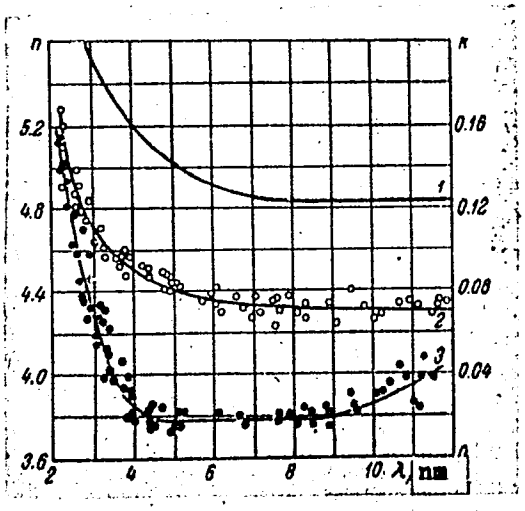


Fig. 2. Optical constants of tellurium layers

Card 4/4

ACC NR: AP6035888 (N) SOURCE CODE: UR/0413/66/000/020/0128/0128

INVENTOR: Pazukhin, S. P.; Valeyev, A. S.; Yakovlev, A. N.; Leont'yev, V. A.

ORG: none

TITLE: Hydroacoustic instrument for detecting underwater obstacles and determining their coordinates

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 20, 1966, 128

TOPIC TAGS: ~~hydroacoustic instrument,~~ hydraulics equipment, underwater obstacle detector, sonar, ~~active sonar,~~ navigation equipment, sonar ~~projector~~ equipment, hydraulics engineering

ABSTRACT: An Author Certificate was issued for a hydroacoustic instrument for detecting underwater obstacles and determining their coordinates. The instrument consists of a transducer with a drive for its rotation, lowering, and raising, a transmitter, receiver, indicator, synchronizer, power supply, and control panel. To improve the accuracy of measurements in shallow water, the instrument is equipped with a tuned piezoelectric vibrator, whose rectangular emitter has a step-like cross section, ensuring that the lower limit of the sonar beam pattern direction is parallel to the traveling level.

SUB CODE: 09, 17/ SUBM DATE: 29May63/ ATD PRESS: 5106

Card 1/1 UDC: 531.719.35

VALEYEV, A.Sh.

Electrolytic polishing of metals at low current densities. Izv. Kazan.fil.AN SSSR Ser.khim.nauk no.1:75-79 '50. (MLRA 10:5)
(Electrolytic polishing)
(Metals--Finishing)

VALEYEV, A.Sh.; VOZDVIZHENSKIY, G.S.; DMITRIYEV, V.A.

Electrolytic polishing of heterogeneous alloys. Trudy KKHTI no.15:22-25 '50. [publ. '51] (MIRA 12:12)
(Alloys) (Electrolytic polishing)

VALEYEV, A. Sh.

USSR/Physics - Anodizing
Electrolysis

11 May 50

"Anodizing of Textured Metal," G. S. Vozdvizhenskiy, A. Sh. Valeyev, T. N. Grechukhina, Chem Inst imeni A. Ye. Arbuzov, Kazan Affiliate, Acad Sci USSR, 3 pp

"Dok Ak Nauk SSSR" Vol LXXII, No 2

Discusses anodizing process considering surface texture of metal. Experiments demonstrated that metals with different crystallographic characteristics respond differently to anodizing action. Method of surface preparation also has definite effect on quality of oxide films. Application of electrdy polishing, instead of mechanical preparation of surface, promotes more uniform, and consequently less porous, films. All experiments have been conducted for aluminum, and those for iron and copper are being continued.

PA 160T83

VALEYEV, A. Sh.

USSR/Chemistry - Anodic Oxidation Jan 51

"Anodic Oxidation of Texturized Metal," G. S. Vozdvizhenskiy, A. Sh. Valeyev, T. N. Grechukhina, Chem Inst imeni Acad A. Ye. Arbuzov, Kazan Affiliate, Acad Sci USSR

"Zhur Fiz Khim" Vol XXV, No 1, pp 87-92

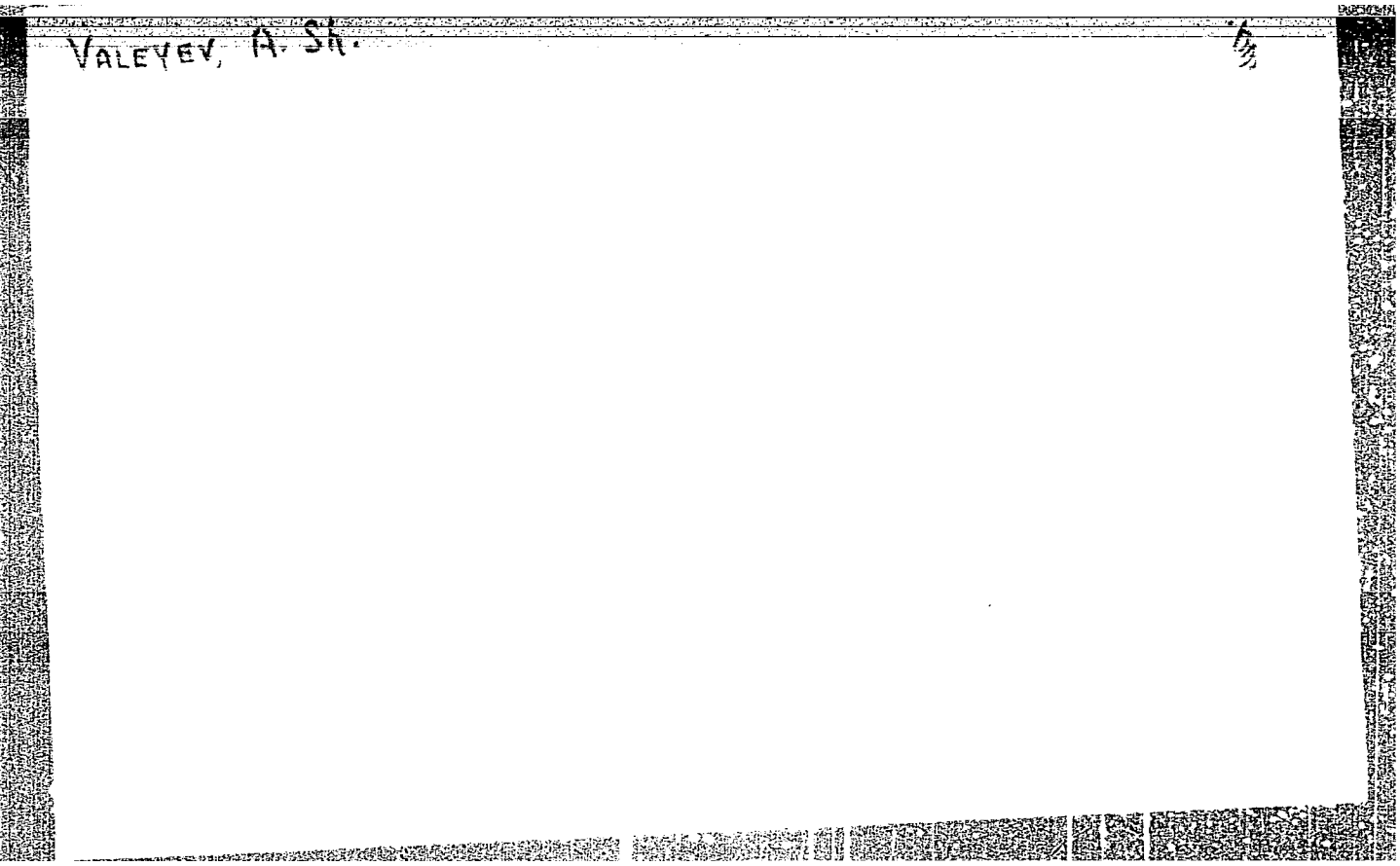
Conducted expt on anodic oxidation of differently texturized (polished with emery, mechanically, electrolytically) samples of Al, duralumin, Cu, Fe. Found texture was detg factor. Exptl material

LC 180T17

USSR/Chemistry - Anodic Oxidation (Contd) Jan 51

demonstrated correctness and gen nature of concepts of anodic processes for electrolysis with metal anode and of processes of "electrolytic dissolving" of metals.

LC 180T17



VALEYEV, A. Sh.

USSR

The throwing power of electrolytes for the electrochemical finishing of cutting tools. G. S. Vozdvizhenskii, A. Sh. Valeev, and G. A. Gorbachuk. *J. Appl. Chem. U.S.S.R.* 26, 1031-4(1953)(Engl. translation).—See *C.A.* 48, 4335a. H. L. H.

VOSDVIZHENSKIY, G.S.; VALEYEV, A.Sh.; GORBACHUK, G.A.

Dispersibility of electrolytes during the electrochemical processing of cutting tools. Zhur.prikl.khim. 26 no.10:1094-1096 O '53. (MLRA 6:10)
(Electrolytes) (Cutting machines) (Metals--Finishing)

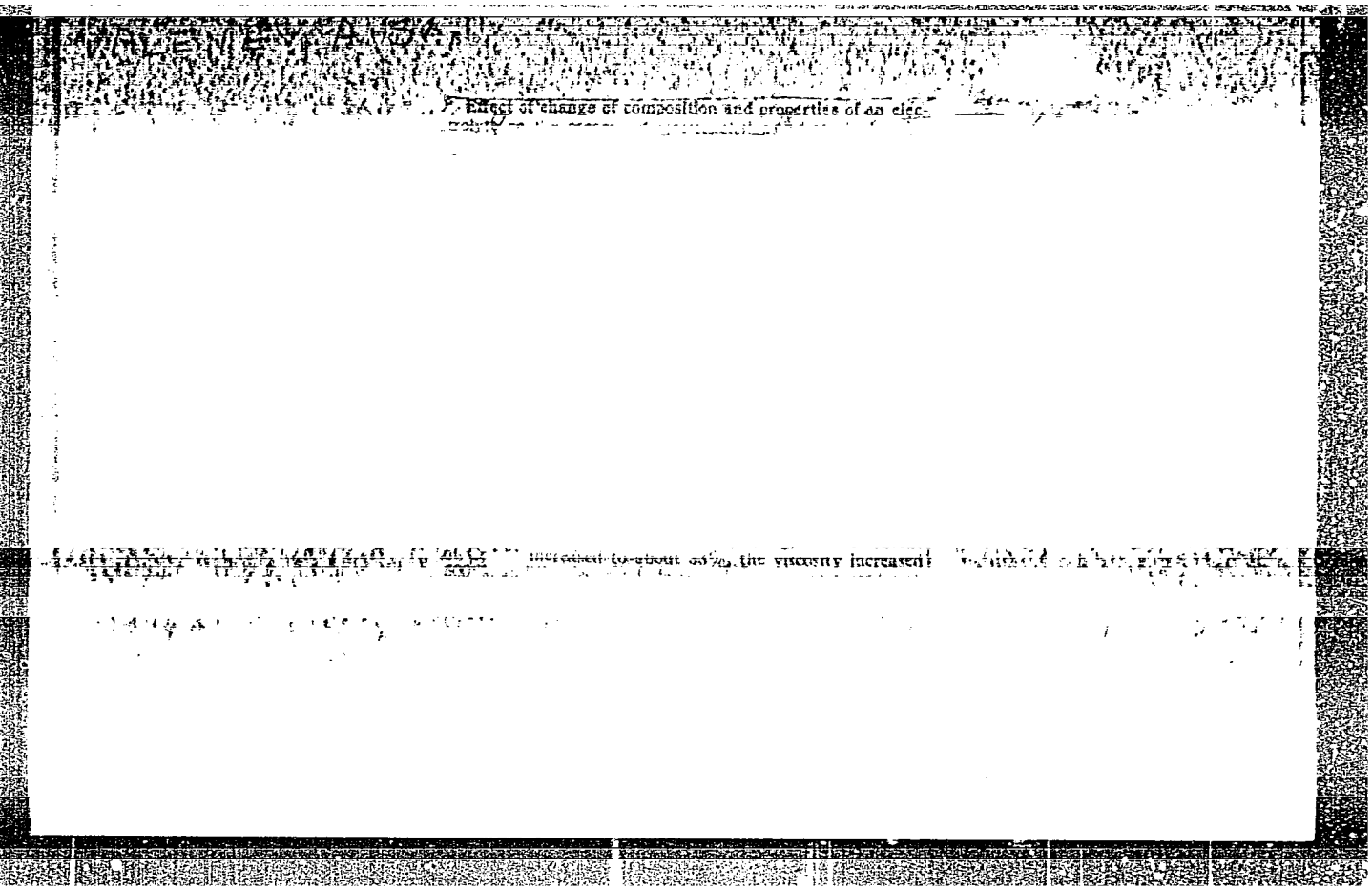
VALEYEV, A. Sh.

62 "[Investigation of the Mechanism of Electrolytic Polishing of Metals. I.—] Mechanism of the Electrolytic Polishing of Duralumin. A. Sh. Valeev (*Zhur. Priklad. Khim.*, 1954, 27, (8), 882–890).—[In Russian]. Plates of Duralumin D-16-T were electropolished in a bath contg. equal percentages (35·5–43·0 wt.-%) of H_2SO_4 and H_3PO_4 + 3·0% CrO_3, using Pb cathodes 5 cm. distant. Each specimen was first emeried, so as to obtain uniform conditions. The duration of the tests ranged from 20 min. at an anodic c.d. (D_a) of 5 amp./dm.^{2} to 1·0 min. at 150 amp./dm.^{2}. For a specimen electropolished in a bath with H_2SO_4 and H_3PO_4 concentrations of 40%, at 80° C., the curve showing the variation in D_a with anode potential (e_a) was only slightly displaced from the curve of D_a against the voltage V; i.e. the bulk of the resistance is concentrated in the near-anodic layer of electrolyte. The curves consisted of two sharply rising portions (0–12 amp./dm.^{2} at ~0–1 V., and ~30–150 amp./dm.^{2} at ~17–20 V.) seperated by a slight fall and a gently rising portion. The first rise corresponded with etching of the metal and formation of a black deposit, easily rubbed off; in the second portion of the curve, the black deposit was not formed and the metal was etched brightly. In the second sharp rise, polishing occurred, becoming converted at very high c.d. into corrosion. In similar tests on a bath with H_2SO_4 and H_3PO_4 concentrations of 43·0%, at 80° C., stirring increased the values of e_a at c.d. >22 amp./dm.^{2} and reduced the values at c.d. <22 amp./dm.^{2}. This is attributed to stirring affecting two opposing processes: the diffusion of the products of anodic dissolution (which lowers e_a), and the production of a thin oxide film (which increases e_a); at 22 amp./dm.^{2} the two effects just balance. The resistance per unit area (r) calculated from e_a, D_a, and e_0 (the static potential) can be used as a measure of the thickness of the layer of anodic products. The max. values of r were: no stirring, 1·26 Ω/dm.^{2} at D_a = 10 amp./dm.^{2}; with stirring, 0·64 Ω/dm.^{2} at 20 amp./dm.^{2}; electropolishing occurred when r = 0·3–0·5 Ω/dm.^{2}, with or without stirring. Diagrams are given showing the effect of temp. and stirring on the D_a/e_a, D_a/r, and D_a/reflectivity curves. The optimum anodic potential increased linearly with fall in temp., and by extrapolation would give a temp. of 110°–125° C. for e_a = 0 (chem. polishing). This was confirmed experimentally, but in chem. polishing the CrO_3 was rapidly decomposed.

—G. V. E. T.

VALEYEV, A-Sh.

[Investigation of the Mechanism of Electrochemical Polishing of Metals. II.—] Microscopical Observation of the Anodic Process in the Electrolytic Polishing of Duralumin. — A. Sh. Valeev (*Zhur. Prikład. Khim.*, 1954, 27, (9), 939–944).—[In Russian]. Cf. *ibid.*, (8), 891; *M.A.*, 23, 103. V. used a horizontally mounted microscope (magnification ×56) to study the behaviour of a Duralumin anode (masked by Bakelite to give a working surface of 1 cm.²) in electropolishing in a soln. contg. (%): H_3PO_4 43, H_2SO_4 43, CrO_3 3, H_2O 11, at 60°–80° C., using a Pb cathode (area 10 cm.²). Before the current was switched on, the Duralumin dissolved with evolution of H, but on switching on the current at c.d. corresponding to the first sharp rise in the anodic potential/c.d. curve, the evolution of H gradually lessened. At the point of discontinuity, the H evolution instantly ceased, and over the whole surface of the anode appeared a layer of turbid liquid different in colour from the main electrolyte, together with a small number of very fine bubbles of O. The thickness of the film increased, and it began to move upwards along the anode surface with the O. With an increase in c.d., the motion accelerated, the O evolution increased, and the liq. film became thinner and more transparent; convection currents appeared in the body of the electrolyte. At 150 amp./dm.² the thickness of the film had become negligible. In experiments with horizontal electrodes (anode beneath) the anodic layer appeared at the same c.d., but the other processes showed some differences. Thus at ~15 amp./dm.² the boundary between the layer and the main electrolyte was sharply defined by bubbles of O which accumulated there until they had coalesced sufficiently to rise further. As the c.d. increased, the electrolyte became turbulent, with the result that the film thickness was not uniform; this explains why polishing is unsatisfactory with horizontal anodes. The anodic products had a d greater than that of the soln. and their rate of dissolution was negligible. The anodic layers, of resistance 0·3–0·5 ohm/dm.², formed over the inclined part and second jump in the potential/c.d. curve showed differences: they were thick and turbid, and thin and transparent, resp. V. discusses theories of electropolishing and concludes that an essential condition is that the adsorption of surface-active substances on the surface should be a min. Electropolishing took place only at the second jump on the potential/c.d. curve, because it is under those conditions that anions, molecules of water, and other surface-active substances are desorbed.—G. V. E. T.



Effect of change of composition and properties of an elec

VALEYEV, A. Sh.

Increasing the duration of serviceability of the electrolyte in electropolishing of steel. A. Sh. Valeev.

[illegible]

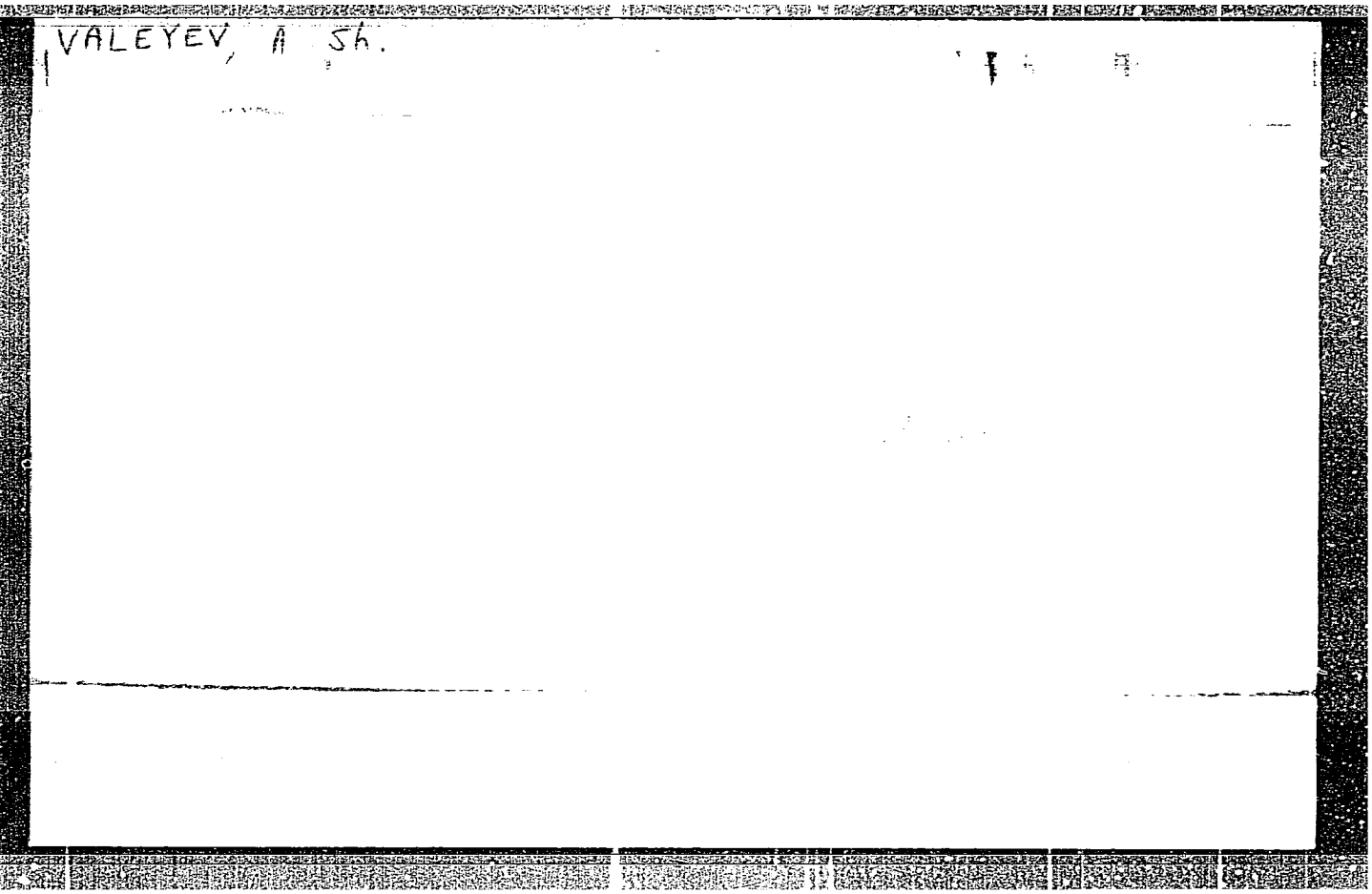
of ... increase in viscosity associated with ... accumulation of ... This study was made to find the conditions necessary to lengthen the serviceability of the electrolyte des... accumulation of Fe. In a cell provided with a diaphragm and an electrolyte contg. orthophosphoric acid 70, CrO_3 14, and H_2O 16%, which had been preheated for 8 hrs. at ... and reduced with a Pt electrode to a Cr^{+++} content of ... 12.5 g.-ion/l. ... satisfactory electropolishing ... range of c.ds. At first φ decreased as the duration increased to 400 amp. hr./l. soln. and then became const. But the c.d. of satisfactory φ, which at first was 10-80 amp./sq. dm., shifted to higher values so that after 100 amp. hrs./l. it was 100 amp./sq. dm. and after 200-300 amp. hrs. ... 170 amp./sq. dm. Above 900 amp. hrs. ... the c.d. for satisfactory φ decreased so that after ... and ... amp. hrs. ... it was 90-100 and 60-70 amp./sq. dm. ... The accumulation of Fe continued to increase ...

heated ... and temp. of ... should be used ...

VALEYEV, A. Sh.

USSR

Change of acidity of the cathodic space during electrol-
ysis. S. I. Berezina, A. Sh. Valeev, G. S. Vordvizhenskiĭ, T. N. Grechukhina, and G. P. Dezider'ev. *Zhur. Fiz. Khim.* 29, 237–43(1955); cf. *C.A.* 46, 7459i.—The potential φ of a platinized Pt cathode in 0.01*N* H_2SO_4 was, e.g., 0.144 v. (against a Hg/HgCl electrode) after current of c.d. 0.05 amp./sq. dm. and 0.680 v. after c.d. 2.00 amp./sq. dm., both 0.604 sec. after the interruption of the current; while 0.20 sec. later, φ was 0.138 and 0.549 v., resp. This potential was a measure of the pH in the cathodic space. The pH calcd. from φ agreed with that detd. in the bulk of the electrolyte at very small c.d. The range of c.d., in which this agreement persisted, was made wider by stirring and by an increase in temp. (to 60°), and narrower by addn. of NaCl or KCl. At higher c.d., the calcd. pH was greater. The concn. of SO_4^{--} ions also was greater (at the cathode) than before the electrolysis. J. J. Bikerman



sq. dm. O begins to [illegible] tion at low c.d. showed it to contain 93.0% Fe and 2.2% P. With 0.75 amp./sq. dm. the black layer was composed of 83.9% Fe and 4.9% P; with 1.25amp./sq. dm. of 85.0% Fe, 11.9% P. The explanation offered for the observed results is based on the Fe passivation in the CrO_3-contg. electro-

W. M. Sternberg

VALEYEV, A.Sh.

137-58-5-10249

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 5, p 194 (USSR)

AUTHORS: Vozdvizhenskiy, G.S., Valeyev, A.Sh., Gorbachuk, G.A.

TITLE: On the Mechanism of the Dissolution of Steel Upon Anodic Polarization by Low-density Currents (K voprosu o mekhanizme rastvoreniya stali pri anodnoy polyarizatsii tokami maloy plotnosti)

PERIODICAL: Izv. Kazansk. fil. AN SSSR. Ser. khim. n., 1957, Nr 3, pp 63-67

ABSTRACT: Results are presented of a study of the mechanism of the dissolution of steel upon anodic polarization by low-density currents in order to clarify the phenomenon of destruction of the specimen in depth without visible destruction of its surface caused by an electropolishing bath. The current efficiency (B_{eff}) was determined by the weight loss due to anodic dissolution and spontaneous dissolution. An increase in the density of the polarizing current, all other conditions being equal, should increase the concentration of Fe salts in the anode area of the bath and reduce the concentration of oxidizer. When the temperature is reduced from 80 to 60°C, the rate of diffusion of the

Card 1/2

137-58-5-10249

On the Mechanism of the (cont.)

oxidizer declines and attains its steady-state value at the very start of the process. When the densities of the polarizing current at the onset of the process are very low, B_{eff} is $<100\%$ as it is at higher densities and under conditions of long-continued polarization. This indicates the presence not only of anodic dissolution but of some other process at the anode, possibly oxidation of trivalent Cr^{3+} ions to Cr^{6+}. The resultant data confirm the author's earlier concepts on the mechanism of breakdown of metals in electropolishing electrolytes.

Ya. L.

1. Steel--[illegible] 2. Anodes--Polarization

Card 2/2

Valeyev, A.Sh.

137-58-5-10251

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 194 (USSR)

AUTHORS: Valeyev, A.Sh., Gorbachuk, G.A.

TITLE: Chemical Processes Accompanying the Dissolution of Steel in Anodic Polarization by Low-density Currents (Khimicheskiye protsessy, soprovozhdayushchiye rastvoreniye stali pri anodnoy polyarizatsii tokami maloy plotnosti)

PERIODICAL: Izv. Kazansk. fil. AN SSSR. Ser. khim. n., 1957, Nr 3, pp 69-74

ABSTRACT: The results of an analytical study of the causes of the dissolution of Fe on anodic polarization by low-density currents in electropolishing bath containing Cr acid are presented. The process of dissolution proceeds with reverse precipitation of highly disperse Fe as a loose friable mass. The processes of dissolution and reverse liberation proceed in the depth of the metal, virtually without affecting its surface layer. A study was made of the applicability of the equation $Cr_2O_7 + 6Fe^{2+} + 14H^+ \rightarrow Fe^{3+} + 2Cr^{3+} + 7H_2O$ for the calculation of the consumption of the Cr_2O_7 inhibitor. It is shown that an anomaly in the redox process of conversion of the Cr compounds was observed. The

Card 1/2

Chemical Processes Accompanying (cont.)

usual process of reduction $Cr^{6+} \rightarrow Cr^{3+}$ is not confirmed by the analytical data. This anomaly obviously pertains to the process of reduction of Cr on cathode segments of the microcells of the polarizing electrode.

Ya. L.

1. Steel--Disintergration 2. Anodes--Polarization

Card 2/2

31548
S/081/61/000/022/011/076
B102/B108

5.4700

AUTHORS: Valeyev, A. Sh., Gorbachuk, G. A.

TITLE: Processes occurring in the range of the first rize of the polarization curve for anodic dissolution of steel in electropolishing electrolyte

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1961, 66, abstract 22B469 (Izv. Kazansk. fil. AN SSSR. Ser. khim. n., no. 5, 1959, 61-69)

TEXT: The mechanism of anodic dissolution of a metal in an electropolishing electrolyte is studied. The measured polarization curves (PC) for carbon steel 50 and an electrolyte consisting of 70% H_3PO_4 + 14% CrO_3 + 16% H_2O, at 80°C are presented, as well as photomicrographs of the specimens treated under conditions corresponding to different points of the PC. The PC showed two sections of current rise and a range of a limiting current. The cause of the dull etching of the specimens in the range of the first current rise is investigated. It is assumed that under these conditions the passivating film is incomplete which leads to

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Processes occurring in the range ...

microcell operation, causing separation of a loose Fe layer in the cathode region. At $i < 0.7$ a/dm^2, the Fe layer is formed under a thin metal film (RZhKhim, 1956, No. 23, 75605), at $i > 0.7$ a/dm^2 the number of active region increases, and the highly disperse Fe is deposited on the whole surface of the specimen. It is pointed out that redox reactions in the electrode-near regions, e.g. interaction between Fe^{2+} and $Cr_2O_7^{2-}$ have to be taken into account. In the authors' opinion the proposed etching mechanism verifies their own data on the dependences of the effective metal yield with respect to current and losses in weight of the specimens owing to anodic dissolution and self-dissolution on the composition of the electrolyte, on the magnitude of i, and on the duration of the polarization. [Abstracter's note: Complete translation.]

VALEYEV, A.Sh.

New method for obtaining frosted finish and crystal-type coatings. Mashinostroitel' no.5:40-41 My '61. (MIRA 14:5)
(Metals--Finishing)

VALEYEV, A.Sh.; GRECHUKHINA, T.N.

Use of the photogalvanic method in the study of mechanism underlying electrode processes. Izv.Kazan.fil. AN SSSR. Ser.khim.nauk no.6: 183-191 '61. (MIRA 16:5)

(Electrodes) (Photochemistry)

L [illegible]-65 [illegible]

ACCESSION NR: AR5012290 UR/0058/65/000/003/D084/D084

SOURCE: Ref. zh. Fizika, Abs. 3D672

AUTHOR: Valeyev, A. S.

TITLE: Determination of optical constants of layers of antimony trisulfide in the infrared region of the spectrum

CITED SOURCE: Sb. Itog. nauchn. konferentsiya Kazansk. un-ta za 1962 g. Kazan', Kazansk. un-t, 1963, 59-63

TOPIC TAGS: infrared material, antimony trisulfide, optical constant

TRANSLATION: A method is described for determining the optical constant of thin weakly absorbent layers of Sb_2S_3 based only on the measured interferometer diagram of the bandpass [illegible] of the layer, [illegible] values of n and κ are shown graphically as a function of wavelength for the 2-20 μ region. For $\lambda > 3.5$ μ, $n = 2.6$ and only in the region < 3.5 μ does n increase to 2.9. Absorption in the shortwave region is very [illegible] farther on absorption increases [illegible] Precision of measurements of κ is 20 30%. V. N.

Card 1/2

L 46312-65

ACCESSION NR: AR5012290

SUB CODE: OP ENCL: 00

Card 2/2

GRECHUKHINA, T.N.; VAIEYEV, A.Sh.

Connection between structural changes in copper surface during anodic dissolution and the semiconductor properties of the originating film. Izv. AN SSSR. Ser. khim. no.11:1942-1945 '65. (MIRA 18:11)

1. Khimicheskiy institut im. A.Ye. Arbuzova AN SSSR.

VALEYEV, A.Sh.; CHVALA, M.A.

Photoelectrochemical study of anodic dissolution of iron.
Izv. AN SSSR. Ser. khim. no.11:1946-1949 '65. (MIRA 18:11)

1. Khimicheskiy institut im. A.Ye. Arbuzova AN SSSR.

VALEYEV, A.Sb.

Technique of determining the optical constants of thin weakly absorbing layers. Opt. i spektr. 18 no.5:889-891 My '65. (MIRA 18:10)

VALEYEV, A.Sh.

Use of light diffraction in the pure-shadow method of determining the refractive index of electrolytes in the electrode zone. Zhur. fiz. khim. 39 no.3:791-794 Mr '65. (MIRA 18:7)

1. Kazanskiy khimicheskiy institut imeni akademika Arbuzova AN SSSR.

[illegible], A.Sn.; [illegible], [illegible]

Optical (clear shadow) method for the study of [illegible] dissociation of copper. Zhur. fiz. khim. [illegible] 196[illegible] [illegible]

1. Khimicheskiy institut imeni Arbuzova AN [illegible]. Submitted Nov. [illegible], 196[illegible].

VALEYEV, A. Sh. (Kazan')

Pure screen-shadow method for determining the refractive index of an electrolyte and its gradient in the electrode zone. Zhur. fiz. khim. 39 no. 1:246-251 Ja '65
(MIRA 19:1)

1. Khimicheskiy institut imeni akademika A. Ye. Arbuzova AN SSSR. Submitted February 26, 1964.

L 25634-66 EWT(l)/EWT(m)/EWP(w)/T/EWP(t) IJP(c) JD/AT

ACC NR: AP6016110 SOURCE CODE: UR/0062/65/000/011/1942/1945

AUTHOR: Grechukhina, T. N.; Valeyev, A. Sh.

ORG: Chemical Institute im. A. Ye. Arbuzov, AN SSSR (Khimicheskiy institut AN SSSR)

TITLE: Relationship of the structural changes of the surface of copper during anodic solution to the semiconductor properties of the film that arises

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 11, 1965, 1942-1945

TOPIC TAGS: metal surface, copper, photoelectric effect, semiconducting film, electron diffraction analysis

ABSTRACT: The photoelectric phenomena and structural changes in the surface of metals during anodic solution were studied in various electrolytes under the conditions of the formation of a very thin oxide film. A definite interrelationship was established between the structural changes and the magnitude and nature of the photoelectrochemical effect that arises. The structural changes on the surface of copper were studied during anodic solution in a 3% copper sulfate solution with addition of 1% sulfuric acid. Solution at current densities lying above the abrupt increase in the potential leads to a smoothing out of the microroughnesses of the surface without luster. Electron diffraction studies established that a thin film of cuprous oxide arises on the copper surface in this case. On the basis of the data of photoelectrochemical investigations, the authors hypothesize that the smoothing of the surface is due to the high-resistance contact layer of cuprous oxide at the interface with copper. The authors thank G. S. Vozdvizhenskiy for the discussions of the work and for his advice. Orig. art. has: 2 figures. [JPRS]

SUB CODE: 20 / SUBM DATE: 04May64 / ORIG REF: 008 UDC: 541.13

Card 1/1

VALEYEV, A.V., inzh.

Investigating the rotor mechanism for the removal of farm manure. Mekh. i elek. sots. sel'khoz. 21 no.3:54 '63.
(MIRA 16:8)

1. Ryazanskiy sel'skokhozyaystvennyy institut im. P.A. Kostycheva.
(Farm manure—Transportation)

YEDIGAROV, S.G.; VOLOKH, I.B.; KANTSELSKIN, K.Ye.; MAYSKIY, A.A.; VALIYEV, R.Kh.; NAGUMNOV, G.I.; USMAGILOVA, F.Kh.

Excavator for uncovering pipelines in the ground. Transp. i khran. nefti i nefteprod. no.10:13-14 '64.

(MIRA 17:12)

1. Nauchno-issledovatel'skiy institut po transportu i khraneniyu nefti i nefteproduktov.

VOROB'YEV, N. I.; VALEYEV, F. Kh.

"Narodnoye prikladnoye iskusstvo tatar Povolzh'ya."

report submitted for 7th Intl Cong, Anthropological & Ethnological Sciences, Moscow, 3-10 Aug 64.

SALIMZHANOV, E.S.; BELOV, A.M.; PELEVIN, L.A.; ROSTE, Z.A.; GAZIZOV, Z.S.; BAYMUKHAMETOV, K.S.; VALEYEV, F.V.; RUSSKIKH, V.N.

Maximum overall petroleum yield of a flooded well. Izv.vys.ucheb. zav.; neft' i gaz 5 no.12:39-44 '62. (MIRA 17:4)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina.

L 08091-67 EWT(l)/EWT(m) FDN/WE

ACC NR: AP6029992 SOURCE CODE: UR/0413/66/000/015/0196/0196

INVENTOR: Zhukovskiy, A. I.; Orlovskiy, V. I.; Melkov, N. N.; Aleshin, V. A.; Kuteminskiy, Yu. A.; Valeyev, F. Sh.

ORG: none

TITLE: A device for introducing additives while fueling aircraft. Class 62, No. 184150

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 196

TOPIC TAGS: aircraft fuel system, fuel additives, aircraft fuel system equipment

ABSTRACT: An Author Certificate has been issued for a device for introducing additives while fueling an aircraft. It contains a tank for the additives with a measuring glass, receiving neck, and a drain tap connected with a pipe through a pump, a flow tap, and a sprayer with a fuel-supply line. For the automatic regulation of the fuel additive, its pump is connected to a vane pump, which is inside the fuel-supply line and is spun by the flow of fuel. [SA]

SUB CODE: 21, 01/ SUBM DATE: 14Mar64

Card 1/1 nrl UDC: 629.13.01/.06

VALEYEV, G.

On old positions. Prom.koop.no.10:60 O '55. (MLRA 9:4)

1.Predsedatel' pravleniya arteli "Rekord".
(Kuybyshev--Hats)

VALEYEV, G.

There is a need for a uniform method of converting wage funds when workshops overfulfill their production plans. Sots. trud 8 no.8:100-101 Ag '63. (MIRA 16:8)

1. Nachal'nik otdela truda i zarabotnoy platy Ufimskogo neftepererabatyvayushchego zavoda im. XXII s"yezda Kommunisticheskoy partii Sovetskogo Soyuza.
(Ufa--Wages--Petroleum workers)

83529

S/115/60/000/009/009/011
B012/B054

911300: 1006, 1030, 1144

AUTHORS: Mirovitskiy, D. I., Valeyev, G. G., and Budagyan, I. F.

TITLE: Measurement of the Complex Reflection Factor of Dielectric Material

PERIODICAL: Izmeritel'naya tekhnika, 1960, No. 9, pp. 51-53

TEXT: The so-called free-space measuring method is used more and more for measuring the electromagnetic parameters of various materials. Here, it is recommended for measuring the complex reflection factor of the workpiece; the simple formulas from the paper (Ref. 7) should be used for calculating the electromagnetic parameters of the workpiece. An instrument for measuring the complex reflection factor of a plane-parallel sheet metal in the free space is described, and shown in Fig. 1. The instrument is a system of lines for transmitting the surface wave, and consists of a directional coupler (Ref. 9), a balancing device, and a phase shifter. The balancing device compares the controlled reference signal with the unknown signal reflected from the sample measured. The modulus of the reflection factor of the sample is determined from the angle of inclination of the threads of

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Measurement of the Complex Reflection Factor of Dielectric Material

S/115/60/000/009/009/011
B012/B054

the standard reflector whereas the phase is determined from the indication on the rough and fine scale of the phase shifter. Fig. 2 shows a variant of the instrument described. This variant uses a controllable balancing device for balancing the amplitudes of the reference signal and of the signal measured. Here, the modulus of the reflection factor is determined from the angle of inclination of the dielectric waveguide section of the balancing device whereas the phase is determined in the same way as with the first instrument. It is pointed out that the most progressive optical measuring methods are used with the instruments described. Two causes of the high accuracy of measurement of the instruments are mentioned: 1) The standard reflector in the first, and the controllable balancing device in the second instrument make it possible to balance with high accuracy the amplitudes and phases of the reference signal and of the signal measured by means of successive tunings. 2) The interaction between the instrument antenna and the sample, which otherwise leads to errors, is very low in these instruments, which makes it unnecessary to use the more complicated measuring method required in other cases. There are 2 figures and 11 references: 8 Soviet.

Card 2/2

S/109/60/005/07/005/024
E140/E163

9.1400

AUTHORS: Mirovitskiy, D.I., and Valeyev, G.G.

TITLE: Surface-Wave Directional Couplers

PERIODICAL: Radiotekhnika i elektronika, Vol 5, No 7, 1960, pp 1078-1084 (USSR)

ABSTRACT: An experimental investigation of a new type of directional coupler consisting of two intersecting surface-wave transmission lines is described. The coupler has a high directivity over a wide frequency band (greater than 45 dB) and low insertion loss. Three designs are discussed: cross-type coupler, consisting of two intersecting transmission lines; antenna-type coupler, in which the auxiliary channel is formed by a portion of free space; and a radial-type coupler. The dielectric waveguides were composed of methylmethacrylate excited by a horn terminating a metal waveguide. The energy supplied to the auxiliary channel is basically defined by the delay in phase velocity of the surface waves in the fundamental and auxiliary-channel lines, the angle of the lines and the distance between them. Interference effects in the coupling region and other reasons make the derivation of analytical relations difficult. It was found

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experimentally that the magnitude of the coupling coefficient between the fundamental channel and the auxiliary channel could be adjusted between 0 and 95 per cent. To eliminate direct coupling between the exciter and the auxiliary channel a longitudinal spiral of dielectric waveguide could be used in the auxiliary channel, changing the orientation of the electric field by 90°. It is claimed that the characteristics of these couplers are better than those of the Fox-Miller (Ref 7) and the King (Ref 8) couplers. A reflectometer was developed on the basis of these directional couplers for the measurement of reflection coefficients of dielectric materials. Multi-wave dielectric-stub antennae with multiple or single exciting circuits have also been developed on the basis of these devices.
There are 13 figures and 12 references, of which 3 are English and 9 Soviet.

SUBMITTED: October 2, 1959

Card 2/2

S/109/60/005/07/019/024
E140/E163

9.1400

AUTHORS: Mirovitskiy, D.I., and Valeyev, G.G.

TITLE: Hybrid Junction for Surface-Wave Lines

PERIODICAL: Radiotekhnika i elektronika, Vol 5, No 7, 1960, pp 1179-1182 (USSR)

ABSTRACT: Double T-junctions composed of surface-wave directional couplers (see abstract 5 of the present journal) are investigated. The operating principle is based on the fact that in the H-plane coupler there is cophase distribution of the signals in the output arms while in the E-plane coupler, anti-phase distribution. Methylmethacrylate and polystyrene surface-wave lines were employed. Isolations exceeding 54 dB were obtained in a band of 1 : 1.4. The shapes were found by employing paraffin-wax mixtures with barium titanate powder, permitting varying the dielectric constant between 3 and 25 with low electrical losses. A 12-terminal network for signal distribution is shown in Fig 6. There are 6 figures and 5 references, of which 4 are Soviet and 1 is French.

SUBMITTED: November 17, 1959

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20698

9.1800 (also 2603, 1127)

S/120/61/000/001/036/062
E192/E382

AUTHORS: Mirovitskiy, D.I., Budagyan, I.F. and Valeyev, G.G.

TITLE: Ultrahigh-frequency Refractometer Based on Surface-wave Lines

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No. 1, pp. 116 - 120

6.

TEXT: The device is designed for the measurement of the amplitude and phase of the refraction coefficient of a sample which is situated in the narrow beam of an axial radiating antenna. It is based on the surface-wave devices (Ref. 10) and follows the principle of the Michaelson refractometer (Fig. 1). The operation of the system is as follows: a signal from the generator 1 propagates along a surface-wave line and is radiated towards the sample 4 ; a portion of the signal is transmitted into a standard-signal section 1 - 2 - 11 . The portion 3 of the main section is in the form of a dielectric rod radiating antenna, while 5 is a receiving antenna which captures some of the signal transmitted through the sample. Analogously, the portion 11 of the control section

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Ultrahigh-frequency ....

is a rod dielectric radiating antenna and 8 is a receiving antenna which receives the signal passing through the standard 9 . The signals transmitted through the sample and the standard are applied to a balancing device 6 (through the receiving antennae 5 and 8), which is applied to a null indicator 7 . The surface-wave lines in the instrument are in the form of dielectric waveguides, these being polystyrol rods having a cross-section of 0.31 x 0.62 λ . A fine metal grid made of filaments having a diameter of 6.1×10^{-4} λ and a winding pitch of 3.9×10^{-3} λ is used as the standard. The refraction coefficient of the sample is measured by a successive adjustment of the amplitude and phase of the signal passing through the standard 9 until it is fully compensated by the signal which passes through the measured sample 4 . The full compensation is shown by the null indicator 7 . The modulus of the refraction index of the sample, at full compensation, is equal to the modulus of the refraction index of the standard, which can be

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Ultrahigh-frequency ....

determined from an experimental graph showing $T = f(\alpha)$, where α is the angle of inclination of the standard refraction grating relative to the orientation of the electric field of the wave. The phase of the refraction index is practically constant when the inclination angle of the grating is changed and the results of the measurement are therefore unambiguous. The phase of the sample is determined from the readings of two scales of the phase shifter, which is situated in the standard-signal section; the position of this phase-shifter is such that it corresponds to the full compensation of the main and the standard signals, as observed on the null indicator. The coarse phase control Φ_1 of the standard signal is effected by changing the length of the path traversed by the surface wave of the standard signal. The fine adjustment of the phase of the standard signal Φ_T is done by means of an electrical vernier consisting of a dielectric waveguide which can be displaced along the axis 8 - 11 by means of a micrometer screw 12. The amplitudes of the standard and the measured signals can also be compared by means of a

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E192/E382

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controlled balancing device; the standard refraction grating is t h e n not necessary. A refractometer based on this principle is briefly described. There are 7 figures and 16 references: 12 Soviet and 4 non-Soviet.

SUBMITTED: December 3, 1959

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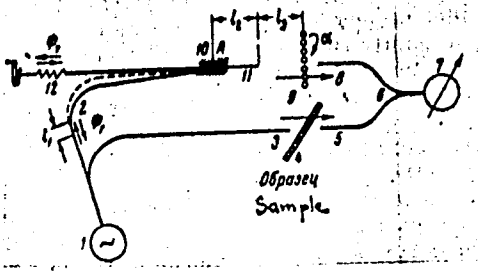
20698
S/120/61/000/001/036/062
E192/E382

Ultrahigh-frequency

Fig. 1:



Card 5/5

TOLCHENOV, B. N., podpolkovnik meditsinskoy sluzhby; VALEYEV, G. Kh., starshiy leytenant meditsinskoy sluzhby

Electrophoretic examination of protein fractions of the blood serum in rheumatic fever in young subjects. Voen.-med. zhur. no.12:28-30 D '61. (MIRA 15:7)

(BLOOD PROTEINS) (RHEUMATIC FEVER) (ELECTROPHORESIS)

VOLAROVICH, M.P.; VALEYEV, N.A.; PARAKHONEAK, E.T.

Specific resistance of rocks in constant and variable [illegible] fields. Izv. AN SSSR Fiz. zem. no.5:51-56 '65.

(MIRA 18:9)

1. Institut fiziki Zemli AN SSSR.

VALEYEV, K.A.; PARKHOMENKO, E.I.

Electric properties of rocks in constant and variable electric fields. Izv. AN SSSR. Fiz. zem. no.12:45-52 '65.

(MIRA 19:1)

1. Institut fiziki Zemli AN SSSR. Submitted March 4, 1965.

L 32734-66 EWT(1) GW

ACC NR: AP6010817 SOURCE CODE: UR/0387/65/000/012/0045/0052

AUTHOR: Valeyev, K. A.; Parkhomenko, E. I. 46 B

ORG: Institute of Physics of the Earth, Academy of Sciences, SSSR (Institute fiziki zemli, Akademiya nauk SSSR)

TITLE: Electrical properties of rocks in direct and alternating electrical fields 12

SOURCE: AN SSSR. Izvestiya. Fizika Zemli, no. 12, 1965, 45-52

TOPIC TAGS: electric property, mineral, dielectric constant, ELECTRIC FIELD, ELECTRIC RESISTANCE

ABSTRACT: The purpose of this investigation was to establish the true character of the regularity of the change of resistivity and the dielectric constant with frequency in order to increase the quality of interpreting the data from field investigations. The experiments were carried out on sandstone, limestone, dolomite, marl, and siltstone. The investigation revealed that the character of the frequency dependence of the electrical parameters of sedimentary rocks is determined by the content of pore water in them. The resistivity of sedimentary rocks, whose absolute value does not exceed 10^6 ohm·cm in the frequency range from 0 to 10^5 cps does not depend on frequency. With an increase of resistance

Card 1/2 UDC: 552.1:537

ACC NR: AP6010817

the role of the active component of the polarization current increases which is the cause for the change of resistance with frequency. The dielectric constant of sedimentary rocks in the water-content range from 3 to 15% at frequencies from 10^2 to 10^5 cps is virtually independent of the frequency. At small values of the water content (approximately from hundredths of a percent to 3%) a frequency dependence of the dielectric constant is observed and its value in the frequency range from 10^2—10^5 cps does not exceed 5—6 fold. The dispersion of the values of the dielectric constant of wet rocks, which is observed in measurements with electrodes directly adjacent to the rocks, is fictitious and is caused by contact phenomena. Orig. art. has: 7 figures and 6 formulas.

SUB CODE: 08, 09 / SUBM DATE: 04Mar65 / ORIG REF: 014 / OTH REF: 001

16.3400

21182

S/141/60/003/006/021/025
E192/E382

AUTHOR: Valeyev, K.G.

TITLE: Method of Solving the System of Linear Differential Equations with Sinusoidal Coefficients

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 6, pp.1113-1126

TEXT: The differential equations considered are in the form:

$$\sum_{k=0}^{n} (A_{0k} + e^{i\omega t} A_{1k} + e^{-i\omega t} A_{-1k}) \frac{d^k Y}{dt^k} = \Phi(t), \qquad (1.1)$$

where A_{jk} are complex constants of the matrix $m \times m$, $\omega = i\Theta$ (Θ is a real number). It is assumed that the following conditions are fulfilled:

$$A_{0n} = E, \quad |A_{-1n}| + |A_{1n}| < 1; \qquad (1.2)$$

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where E is a unit matrix. The problem consists of finding the solution of the system or the vector Y(t) for $t \geq 0$ for the initial conditions given by:

$$Y(0) = Y_0^{(0)}, \ldots, \frac{d^{n-1}Y}{dt^{n-1}}(0) = Y_0^{(n-1)}. \qquad (1.3)$$

The solution is first expressed in the Laplace form and for this purpose a system of linear difference equations is formed; this system is solved by means of continuous matrix fractions. A practical method suitable for the inverse transformation (in order to obtain the original) is indicated; this makes possible the construction of a numerical solution for the differential equations with given initial conditions. Determination of the characteristic parameters of the solutions is based on an equation which is expressed in terms of the coefficients of the system of differential equations without resorting to integration. By this means, it is possible to investigate the dynamic stability of the "elastic" oscillations

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of electrical and mechanical systems which are described by the differential equations with sinusoidal coefficients. There are 7 references: 6 Soviet and 1 non-Soviet.

ASSOCIATION: Leningradskiy politekhnicheskiy institut (Leningrad Polytechnical Institute)

SUBMITTED: May 30, 1960

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16.3400

82488
S/040/60/024/04/01/023
C 111/ C 333

AUTHOR: Valeyev, K. G. (Leningrad)

TITLE: On the Solution and the Characteristic Exponents of the Solutions of Some Systems of Linear Differential Equations With Periodic Coefficients

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol. 24, No. 4 pp. 585-602

TEXT: At first the author considers the general form and some known properties of the Laplace transform of the solutions of homogeneous and inhomogeneous linear differential equations with periodic coefficients. Then he treats the system

$$(4.1) \qquad \sum_{q=-l}^{l} e^{-iqt} L_q(d)\, Y(t) = \Phi(t) \qquad \left(d = \frac{d}{dt}\right)$$

where

$$(4.2) \qquad L_q(d) = \sum_{j=0}^{n} A_{qj} d^j \qquad (q = 0, \pm 1, \pm 2, \ldots)$$

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On the Solution and the Characteristic Exponents of the Solutions of Some Systems of Linear Differential Equations With Periodic Coefficients

and A_{qj} are constant complex m X m matrices, where

(4.3) $$A_{on} \equiv E, \sum_{q=-l}^{l} |Aqn| < 1 \quad .$$

[redacted]

The solution of (4.1) is sought under the initial conditions

(4.5) $$Y(0) = Y_o^{(o)}, \ldots, Y^{(n-1)}(0) = Y_o^{(n-1)} \quad .$$

By applying the Laplace transformation to (4.1) there is obtained a system of linear difference equations for the transform F(p) of (4.1) - (4.5). Then the author introduces complicated matrix functions

$$S(p) = S^{r_0, r_1, \ldots, r_n}_{k_0, k_1, \ldots, k_\infty}(p)$$

defined by iterated series, interpretes them geometrically by polygonal

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82488
S/040/60/024/04/01/023
C 111/ C 333

On the Solution and the Characteristic Exponents of the Solutions of Some Systems of Linear Differential Equations With Periodic Coefficients

lines and investigates their properties. With the aid of the functions S(p) the solution of the difference equations mentioned above is given in a closed form. The results are used in order to calculate characteristic exponents of the solutions of systems which are little different from stationary ones. For systems of second order with periodic coefficients there are given some (partially only necessary) stability conditions. There are 9 lemmata, 13 properties and numerous examples. The author mentions N. N. Krasovskiy, M. G. Kreyn and J. G. Malkin; he thanks A. J. Lur'ye.

There are 10 references: 8 Soviet and 2 American.

SUBMITTED: January 26, 1960

Card 3/3

88748

16.3400 (1103)

S/040/60/024/006/002/024
C111/C333

AUTHOR: Valeyev, K.G. (Leningrad)

TITLE: On Hill's Method in the Theory of Linear Differential Equations With Periodic Coefficients

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol. 24, No. 6, pp. 979-987

TEXT: The author considers the system

$$(1.1) \qquad \sum_{q=-l}^{l} e^{-\omega q t} L_q(d) Y(t) = \Phi(t),$$

where $Y(t)$ is the sought m-dimensional vector, $\omega \neq 0$ purely imaginary,

$$(1.2) \qquad L_q(d) = \sum_{j=0}^{n} A_{qj} d^j \qquad (d = \frac{d}{dt})$$

A_{qj} are constant complex $m \times m$ matrices, $A_{on} = E \ldots A_{qn} = 0$ $(q \neq 0)$. Find the solution $Y(t)$ for initial conditions

$$(1.4) \qquad Y(0) = Y_o^{(o)}, \ldots, Y^{(n-1)}(0) = Y_o^{(n-1)}.$$

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On Hill's Method in the Theory of Linear Differential Equations With Periodic Coefficients

After application of the Laplace transformation for $t \geq 0$ one obtains for the image $F(p)$ of $Y(t)$ the system of linear difference equations

$$(1.5) \qquad \sum_{q=-l}^{l} L_q(p+\omega q)F(p+\omega q) = R(p)$$

where

$$(1.6) \qquad R(p) = Q(p)+\sum_{q=-l}^{l}\psi_q(p+\omega q), \quad \psi_q(p) = \sum_{j=0}^{n-1}\sum_{k=j+1}^{n} A_{qk}Y_o^{(j)}p^{k-j-1}$$

If in (1.5) p is replaced by $p+\omega k$, and if it is divided by $(k\omega)^n$, then, besides (1.5), one obtains the equations

$$(1.7) \qquad \sum_{q=-l}^{l}(k\omega)^{-n}L_q(p+\omega(k+q))F(p+\omega(k+q))=(k\omega)^{-n}R(p+\omega k) \quad (k\neq 0)$$

The determinant of the system (1.5),(1.7) is

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S/040/60/024/006/002/024
C111/C333

On Hill's Method in the Theory of Linear Differential Equations With Periodic Coefficients

$$\Delta(p) = \begin{vmatrix} \cdots & \cdots & \cdots \\ \omega^{-n} L_0(p+\omega) & \omega^{-n} L_1(p) & \omega^{-n} L_2(p-\omega) \\ L_1(p+\omega) & L_0(p) & L_{-1}(p-\omega) \\ (-\omega)^{-n} L_2(p+\omega)(-\omega)^{-n} & L_1(p) & (-\omega)^{-n} L_0(p-\omega) \\ \cdots & \cdots & \cdots \end{vmatrix} \quad (1.8)$$

Theorem 2.1: $\Delta(p)$ and the algebraic complements of the elements of the columns going through $L_0(p)$ converge to entire functions in p which are bounded in an arbitrary finite domain $\sum$. The convergence is absolute and uniform for $p \in \sum$.
The solution of (1.5) then is formally given by

$$(2.3) \qquad F(p) = \sum_{k=-\infty}^{\infty} \Delta^{-1}(p) B_k(p) R(p+\omega k),$$

where the elements of the matrices $B_k(p)$ are entire functions of p.
Theorem 3.1 says that the representation (2.3) is unique, where $\Delta(p)$

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On Hill's Method in the Theory of Linear Differential Equations With Periodic Coefficients

has the period ω, is an entire function of p, and its zeros are the characteristic exponents of the solutions of (1.1).
The solution of (1.1) is obtained by restriction to a finite number of terms in (2.3) and retransformation.
The linear differential equation with sinusoidal coefficients

$$(4.1) \qquad \sum_{k=0}^{n}(a_k^{(0)}+a_k^{(1)}e^{-\omega t}+a_k^{(-1)}e^{\omega t})\frac{d^k y}{dt^k} = \varphi(t)$$

and the system

$$(5.1) \qquad \frac{d^2Y}{dt^2}+\mu N(\theta t)\frac{dY}{dt}+(C+\mu P(\theta t))Y = 0,$$

where C is a diagonal matrix and

$$N(\tau)=\sum_{k=-l}^{l}N^{(k)}e^{ik\tau}, \quad N^{(k)}=\|\nu_{jo}^{(k)}\|_1^m$$

$$P(\tau)=\sum_{k=-l}^{l}P^{(k)}e^{ik\tau}, \quad P^{(k)}=\|\pi_{jo}^{(k)}\|_1^m \qquad (k=0,\pm 1,\ldots,\pm l) \quad (5.2)$$

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On Hill's Method in the Theory of Linear Differential Equations With Periodic Coefficients

are investigated by the same method. The author obtains a number of already known results.
V.A.Yakubovich is mentioned in the paper. The author thanks A.I.Lur'ye.
There are 14 references: 9 Soviet, 2 Swedish, 2 American and 1 Swiss.

SUBMITTED: March 12, 1960

Card 5/5

16.3400

28504
S/040/61/025/002/015/022
D201/D302

AUTHOR: Valeyev, K.G. (Leningrad)

TITLE: On the use of Hill's method in the theory of linear differential equations with periodic coefficients determination of characteristic indices

PERIODICAL: Prikladnaya matematika i mekhanika, v. 25, no. 2, 1961, 314 - 318

TEXT: This article gives the value of the characteristic indices with any desired degree of accuracy, and gives a simple stability criterion for the equation of the second order. A system

$$\frac{d^2Y}{dt^2} + \mu N(\theta t)\frac{dY}{dt} + (C + \mu P(\theta t))Y = 0 \qquad (\theta > 0)$$

is considered, where μ is a small parameter, $C = (\omega_1^2, \ldots, \omega_n^2)$ is a diagonal matrix $\omega_j^2 > 0$ ($j = 1, \ldots, m$), and

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$$N(\tau) = \sum_{k=-l}^{l} N^{(k)} e^{ik\tau}, \quad N^{(k)} = \| \nu_{js}^{(k)} \|_1^m \qquad (k = 0, \pm 1, \ldots, \pm l)$$

$$P(\tau) = \sum_{k=-l}^{l} P^{(k)} e^{ik\tau}, \quad P^{(k)} = \| \pi_{js}^{(k)} \|_1^m \qquad (k = 0, \pm 1, \ldots, \pm l) \qquad (1.2)$$

where $\nu_{js}^{(k)}$, $\pi_{js}^{(k)}$ are complex numbers. Hill's determinant will depend on the complex variable p, and its matrix of order m · m will consist of quasi-elements. Writing $\mu = 0$, $\theta = \theta_0$ it follows that in this case, X is the null matrix for $p = i\omega_g$. A further matrix obtained is called U, and by replacing every element of U which contains μ by zero, the matrix Z is obtained. Calling rows in which the diagonal element is zero and rows which occur in the 2nd infinite matrices of XZ^{-1} particular rows, it follows that in all non-particular rows the elements on the leading diagonal differ from zero. Operating $Det(XZ^{-1})$ in those elements gives a determinant, whose elements occur in the particular rows and columns

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corresponding to the diagonal elements of the particular rows of the matrix XZ^{-1}. To determine the characteristic indices $/p_j - i\omega_g/ \leqslant \varepsilon$ the equation

$$D(p, \theta, \mu) \equiv \mathrm{Det}\| \delta_{sr}((p + k_s\theta i)^2 + \rho_s^2) + \mu b_{sr}(p, \theta, \mu)\|_1^n = 0 \quad (\delta_{ss} = 1, \delta_{sr} = 0, s \neq r) \tag{1.8}$$

$$b_{sr}(p, \theta, \mu) = v_{[s]\,[r]}^{(k_s - k_r)}(p + k_r\theta i) + \pi_{[s]\,[r]}^{(k_s - k_r)} - \mu \sum_{\chi,\,\alpha}{}' (v_{[s]\,\alpha}^{(k_s - \chi)}(p + \chi\theta i) + \pi_{[s]\,\alpha}^{(k_s - \chi)}) \times \tag{1.8}$$

$$\times \frac{v_{\alpha\,[r]}^{(\chi - k_r)}(p + k_r\theta i) + \pi_{\alpha\,[r]}^{(\chi - k_r)}}{(p + \chi\theta i)^2 + \rho_\alpha^2} + \mu^2 \sum_{\chi,\alpha,\beta,\gamma}{}' (v_{[s]\,\alpha}^{(k_s - \chi)}(p + \chi\theta i) + \pi_{[s]\,\alpha}^{(k_s - \chi)}) \times$$

$$\times \frac{v_{\alpha\beta}^{(\chi - \gamma)}(p + \gamma\theta i) + \pi_{\alpha\beta}^{(\chi - \gamma)}}{(p + \chi\theta i)^2 + \rho_\alpha^2} \frac{v_{\beta\,[r]}^{(\gamma - k_r)}(p + k_r\theta i) + \pi_{\beta\,[r]}^{(\gamma - k_r)}}{(p + \gamma\theta i)^2 + \rho_\beta^2} + \ldots \tag{1.9}$$

is obtained, where the prime indicates summation over all possible combinations of integral indices, including those which vanish

for $p = i\omega_g$, $\theta = \theta_0$. The series in (1.9) converges if

$$|\mu| \sum_{k=-l}^{l} (|P^{(k)}| + (|p| + |k0|)|N^{(k)}|) \leqslant \min|(p + k0i)^2 + \omega_s^2| \qquad (1.10)$$

$(s = 1, \ldots, m,\ k = 0, \pm 1, \pm 2, \ldots$ при условии $\omega_s^2 - (\omega_g + k\theta_0)^2 \neq 0)$

where /P/ is the norm of the matrix P. If in (1.8), (1.9) the elements $b_{sr}(p, \theta, \mu)$ are in terms of small quantities $O(\mu^k)$ then (1.8) gives the characteristic indices with an accuracy of $O(\mu^{k+1})$. This method may be used to determine the resonance of quasi-stable systems of differential equations of the first order, with periodic coefficients. In the case of the equation

$$\frac{d^2Y}{dt^2} + (C + \mu P(\theta t))Y = 0 \qquad (2.1)$$

where $N(\tau) \equiv 0$ and $P(\tau)$ is the matrix of I.G. Maklin (Ref. 2: Nekotoryye zadachi teorii nelineynykh kolebaniy (Some Problems of

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the Theory of Non-Linear Oscillations) GITTL, M, 1956) and C, $P(\tau)$ have the forms defined above, then using only the μ^0 term in (1.8), the result will differ only by a non-essential constant multiplier from the result obtained by V.A. Yakubovich (Ref. 3: O dinamicheskoy ustoychivosit uprugikh sistem, DAN SSSR, 1958, t. 121, no. 4) from the equation of dynamic equilibrium. If (1.9) contains terms exact to small powers of u, then it follows that

$$\theta_{\pm} = \frac{\omega_h + \omega_g}{k} + \frac{\mu}{2k}\left\{\frac{\pi_{gg}^{(0)}}{\omega_g} + \frac{\pi_{hh}^{(0)}}{\omega_h} \pm 2d - \frac{\mu}{4\omega_g}\left(\frac{\pi_{gg}(0)}{\omega_g} \pm d\right)^2 - \frac{\mu}{4\omega_h}\right.$$

$$\left.\left(\frac{\pi_{hh}^{(0)}}{\omega_h} \pm d\right)^2 - \frac{\mu}{\omega_g}\sum_{r=1}^{n}\sum_{j=-1}^{1}{}' \frac{\pi_{gr}(-j)\pi_{rg}(j)}{\omega_r^2 - (\omega_g + j\theta_0)^2} - \right. \qquad (2.3)$$

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$$\left. - \frac{\mu}{\omega_h} \sum_{r=1}^{m} \sum_{j=-1}^{1}{}' \frac{\pi_{hr}^{(j)} \pi_{rh}^{(-j)}}{\omega_r^2 - (\omega_h + j\theta_0)^2} \right\} + O(\mu^3), \qquad (2.3)$$

which is Maklin's generalized formula. The condition for stability of a second order equation is

$$\frac{d^2y}{dt^2} + \mu f_1(\theta t, \mu)\frac{dy}{dt} + (\omega^2 + \mu f_2(\theta t, \mu))y = 0 \qquad (3.1)$$

where $\omega^2 > 0$ and f_1, f_2 are real functions of real variables, continuous with respect to μ, where μ is a small parameter $0 \leqslant \mu \leqslant \varepsilon$ $(\varepsilon > 0)$ and

$$f_1(\tau, \mu) = \sum_{k=-\infty}^{\infty} e^{ik\tau} v_k(\mu), \quad |v_0(\mu)| + \sum_{k=-\infty}^{\infty} |k v_k(\mu)| \leqslant c_1 \qquad (3.2)$$

$$f_2(\tau, \mu) = \sum_{k=-\infty}^{\infty} e^{ik\tau} \pi_k(\mu), \quad \sum_{k=-\infty}^{\infty} |\pi_k(\mu)| \leqslant c_2$$

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On the use of Hill's method ...

The author states that this is a better criterion than that given in his pr[illegible]ous work. There are 4 Soviet-bloc references.

SUBMITTED: January 12, 1961

Card 7/7

26142
S/040/61/025/004/021/021
D274/D306

16,3400

AUTHOR: Valeyev, K.G. (Leningrad)

TITLE: On the stability of solutions for a system of two linear first-order differential equations with periodic coefficients for the case of resonance

PERIODICAL: Prikladnaya matematika i mekhanika, v. 25, no. 4, 1961, 794-796

TEXT: The system $\frac{dy}{dt} = (A + \mu B(t))\, y$ (A = const) (1)

is considered; y is a plane vector, μ a small parameter ($\mu \geq 0$), A,B(t) are real 2 x 2 matrices:

$$B(t) = \sum_{k=-\infty}^{\infty} B_k e^{ikt}, \qquad \sum_{k=-\infty}^{\infty} |B_k| \leq c_1 \qquad |A| \leq c_2 \qquad (2)$$

B_k are constant complex matrices. $|A|$ denotes the norm of the matrix $A = \|a_{sj}\|_1^2$, where

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On the stability of solutions...

$$|A| = \max \{|a_{11}| + |a_{12}|, \quad |a_{21}| + |a_{22}| \qquad (3)$$

It is assumed that the characteristic indices p_1, p_2 of the solutions of the system

$$\frac{dy}{dt} = Ay \qquad (4)$$

are numbers of type ∓ 0.5 ni ($n = 1,2,3,\ldots$). E is the unit matrix. Replacing in (1): $y = \exp \{At\} z$, one obtains

$$\frac{dz}{dt} = \mu D(t) z, \qquad D(t) = d^{-At} B(t) e^{At} \qquad (7)$$

where

$$D(t) = \sum_{k=-\infty}^{\infty} D_k e^{ikt}, \quad p_k = C_{n1}B_kC_{n1} + C_{n2}B_kC_{n2} + C_{n2}B_{k-n}C_{n1} + C_{n1}B_{k+n}C_{n2} \qquad (8)$$

Systems (1) and (7) can be considered as equivalent with respect to stability. It was earlier shown by the author (same periodical, v. 24, no. 4, 1960), that the p_1 and p_2 of system (7) are the solu-

On the stability of solutions...

tions of a transcendent equation (which vanish for $\mu = 0$). These solutions, denoted by $\varkappa_1, \varkappa_2$, are real numbers. Since the matrix D(t) of system (7) is real, one of the characteristic indices p_1, p_2 vanishes on the boundary of the region of instability in the parameter space of system (1), i.e. $\varkappa_2 = 0$. Expanding the transcendental equations for sufficiently small values of $|p|, \mu$ (p being a complex variable), one obtains:

$$p^2 + \mu\varkappa_1 p + \mu^2\varkappa_2 + 0\,(|p\mu^2| + |\mu^3|) = 0 \qquad (11)$$

From the Routh-Hurvitz theorem follows the theorem: Let $\mu > 0$ be sufficiently small. 1) If $\varkappa_1 > 0, \varkappa_2 > 0$, the solutions of (1) are asymptotically stable; 2) if either $\varkappa_1$ or $\varkappa_2$ is negative, the solutions are unstable; 3) if $\varkappa_1 > 0, \varkappa_2 = 0$, the solutions are stable, for even n, the solution being periodic with period 2π, and for odd n - half periodic; 4) if $\varkappa_1 = 0, \varkappa_2 > 0$, the solutions are stable (forced); 5) if $\varkappa_1 = 0, \varkappa_2 = 0$, the question of stability requires further consideration. Finally, an example is given

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where χ_2 (with $\chi_1 = 0$) is calculated. There are 2 Soviet-bloc references.

SUBMITTED: March 12, 1961

Card 4/4

VALEYEV, K.G.

Stability of the solution of second-order linear differential equations with sinusoidal coefficients. Izv. vys. ucheb. zav.; radiofiz. 5 no.4:766-783 '62. (MIRA 16:7)

1. Leningradskiy politekhnicheskiy institut im. M.I.Kalinina.
(Differential equations) (Automatic control)

S/141/62/005/006/019/023
E140/E435

AUTHOR: Valeyev, K.G.

TITLE: An investigation of the stability of solutions of a quasi-stationary system of linear differential equations with almost periodic coefficients

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Radiofizika. v.5, no.6, 1962, 1206-1219

TEXT: The paper presents a general method of investigating the subject mentioned in the title, based on the Laplace transform solution in asymptotic expansions of the given type of differential equations. The main attention is given to second order equations, due to their stated importance in mechanical applications.

ASSOCIATION: Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute)

SUBMITTED: March 7, 1962

Card 1/1

S/040/62/026/003/006/020
D407/D301

AUTHOR: Valeyev, K.G. (Leningrad)

TITLE: On linear differential equations with exponential coefficients and stationary lag: The regular case

PERIODICAL: Prikladnaya matematika i mekhanika, v. 26, no. 3, 1962, 449 - 454

TEXT: The Laplace transform of the solution of linear differential equations with exponential coefficients is studied by a method which permits constructing a particular solution, satisfying given initial conditions. The system of equations

$$\sum_{q=0}^{l} e^{-\alpha_q t}\left(A_{qn}\frac{d^n Y(t)}{dt^n}+\sum_{k=0}^{n-1}\int_{-h}^{0} dA_{qk}(\vartheta)\frac{d^k Y(t+\vartheta)}{dt^k}\right)=\Phi(t) \qquad (1.1)$$

is considered, where Y(t) is an m-dimensional vector, and A_{qn} are constant complex matrices; the integrals in Eq. (1.1) are Stieltjes integrals. A system of linear difference-equations is obtained for the transform (F(p) of the solution Y(t). The correspondence between

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F(p) and Y(t) is denoted by an arrow:

$$Y(t) \div F(p), \qquad F(p) = \int_0^\infty Y(t)\, e^{-pt}\, dt \tag{2.1}$$

The difference equations have a unique solution which is obtained by the method of successive approximations, viz.

$$\bar{F}(p) = \Omega(p) + \sum_{\sigma=1}^{\infty} \sum_{q_j=1, 2, \ldots, l} K_{q_1}(p)\, K_{q_2}(p+\alpha_{q_1})\, K_{q_3}(p+\alpha_{q_1}+\alpha_{q_2}) \ldots \tag{2.13}$$

$$\ldots K_{q_\sigma}(p+\alpha_{q_1}+\alpha_{q_2}+\ldots+\alpha_{q_{\sigma-1}})\, \Omega(p+\alpha_{q_1}+\alpha_{q_2}+\ldots+\alpha_{q_\sigma})$$

where K is related to A_{qn}, and Ω to the transforms of $\Phi(t)$. The numbers p_k are considered, defined by

$$p_{k_0, k_1, \ldots, k_l} = \rho_{k_0} - k_1\alpha_1 - k_2\alpha_2 - \ldots - k_l\alpha_l \quad (k_q = 0, 1, 2, \ldots; q = 0, 1, \ldots, l) \tag{3.2}$$

where ρ_{k_0} are the roots of an equation related to the system of linear difference-equations. Theorem 3.1: Let in system (1.1) $\alpha_0 \equiv 0$,

Re $\alpha_q > 0$ ($q = 1, \ldots, l$), $F(t) \equiv 0$. Then the Laplace transform (2.1) of $Y(t)$ can be expressed by the series (2.13). The meromorphic vector $F(p)$ can have poles of finite multiplicity only at the points p_{k_0}, defined by (3.2). The coefficients of the Laurent expansion of $F(p)$ at the points $p = p_{k_0}, \ldots, k_l$, converge to the corresponding expansion-coefficients of the vector $F(p)$. By this theorem, it is possible to expand the solution $Y(t)$ in an asymptotic series for large t, viz.

$$Y(t) \sim \sum_{k_0, k_1, \ldots, k_l = 0}^{\infty} \operatorname{res}\left(F(p)\, e^{pt}\right)\big|_{p=p_{k_0}, k_1, \ldots, k_l} \qquad (3.5)$$

Theorem 3.1, in conjunction with formula (3.5), yield the stability criterion: In order that all the solutions of system (1.1) be stable, it is necessary and sufficient that all the solutions of the truncated system (1.1), viz.

$$A_{0n} \frac{d^n Y(t)}{dt^n} + \sum_{k=0}^{n-1} \int_{-h}^{0} dA_{0k}(\vartheta) \frac{d^k Y(t+\vartheta)}{dt^k} = 0 \qquad (3.7)$$

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be stable. The above method of solution is one of the most convenient methods of solution of a system of linear differential equations in the neighborhood of a removable singularity; this applies in particular to various critical cases. Several examples are considered.

SUBMITTED: February 5, 1962

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S/040/62/026/006/003/015
D234/D308

16.2450

AUTHOR: Valeyev, K.G. (Leningrad)

TITLE: Linear differential equations with exponential coefficients and stationary delays of the argument. Irregular case

PERIODICAL: Prikladnaya matematika i mekhanika, v. 26, no. 6, 1962 1012 - 1024

TEXT: The author considers the system

$$\sum_{q=0}^{l} e^{-\alpha q t}\left(A_{qn}\frac{d^n Y(t)}{dt^n} + \sum_{k=0}^{n-1}\int_{-h}^{0} dA_{qk}(\vartheta)\,\frac{d^k Y(t+\vartheta)}{dt^k}\right) = \Phi(t). \quad (1.1)$$

The integrals are Stieltjes' integrals. The Laplace image of (1.1) is a difference equation, which is solved in series form by successive approximations. The author introduces a single-valued correspondence between products of matrices and generalized numbers $[\kappa, \sigma]$ for which a non-commutative multiplication rule and associa-

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Linear differential equations ...

ted numbers $[\varkappa, \sigma]^{(\gamma)}$ are defined. The properties of the matrix $S_0(p)L_0^{-1}(p)$ are studied with the aid of these numbers. The results are applied to the problem of stability of

$$\frac{d^nY(t)}{dt^n} + \sum_{k=0}^{n-1}\int_{-h}^{0} dA_{0k}(\vartheta,\mu)\frac{d^kY(t+\vartheta)}{dt^k} + \tag{4.1}$$

$$+\mu\sum_{q=1}^{l} e^{-\alpha_q t}\left(A_{qn}(\mu)\frac{d^nY(t)}{dt^n} + \sum_{k=0}^{n-1}\int_{-h}^{0} dA_{qk}(\vartheta,\mu)\frac{d^kY(t+\vartheta)}{dt^k}\right) = 0$$

with a small parameter μ. The poles determining the asymptotic behavior of (4.1) can be found from

$$\text{Det } D(p) \equiv \text{Det } (L_0(p) - L_0(p)\, S_0^*(p)) = 0. \tag{4.2}$$

For the case periodic coefficients two conclusions from (K. Valeyev PMM, v. 24, no. 1960) are given. The method of the above paper is generalized for the case of nearly periodic coefficients. A criterion of asymptotic stability is derived for the equations with

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Linear differential equations ... S/040/62/026/006/003/015
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nearly periodic coefficients

$$(1 + \mu f_2(t)) \frac{d^2y}{dt^2} + \mu f_1(t), \quad \frac{dy}{dt} + (\lambda + \mu f_0(t))\, y = 0. \qquad (7.1)$$

SUBMITTED: April 29, 1962

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